ORIGINAL ARTICLE

Situated interactions between audiovisual media and African herbal lore

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Abstract We describe a rural African community's interactions in recording and interpreting video on herb lore in our endeavours to design digital systems that extend sharing knowledge in a system of traditional medicine (TM). Designing for such a system involves reflecting on own narratives about medicine and media and recognising that narratives reflect "cultural logics" and media transforms narratives. We used video as sites to explore meaning-making in herb lore; anchor our dialogic with, and about users; and, elicit design ideas. Participants' prioritise speech, gesture and bodily interaction, above other visual context. Further, recordings can embody nuances in social relations and depict temporal patterns that are integral to TM pedagogy. However, such embodiments and depictions are disrupted by affordances of, and associations with, media; our abstraction; and, non-local ontologies (such as chronologic or geographic point-based representation). Our insights produce new design patterns by orienting us towards representing herb lore within the social-relational spaces that contextualise knowing, doing and moving, linked to corporeal and felt-experiences. More generally, uncovering transformations when media and narrative interact can improve analysis and designing for logics and literacies that profoundly differ from those typifying ubicomp.

Keywords Rural · Indigenous knowledge systems · Traditional medicine · Orality · Cultural logic · Narrative · Storytelling · Video

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1 Introduction

Various initiatives aim to enable remote rural communities to share their wisdom and practical know-how using audiovisual media for storytelling [4] and numerous insights suggest that systems design should respond to people's narrative predispositions in thinking about the world [22]. Narratives involve 'cultural logics', or collective ways of encountering, organizing and making sense of the world [7]; and, media transform narratives. Here, we explore interactions between video and narratives about herbs in a system of traditional medicine (TM). We aim to design digital systems compatible with how Herero communities in rural Namibia gain, enhance, convey and conceptualise herb lore. Thus, we seek a sensitivity to transformations introduced by media in order to orient designing [7] in a loci that is pertinent to millions but has been peripheral to ubicomp.

The World Health Organisation (WHO) summarises TM as the sum of all knowledge and practice, whether explicable or not, used to diagnose, prevent and eliminate physical, mental or social imbalance, which relies exclusively on experience and observation transferred from generation to generation. Thus, first we outline how

traversing between technology and TM yields opportunities and implicates our own narratives about medicine and media. Next, we describe a rural Herero community's interactions in recording and interpreting video on herb lore. Then, we illustrate phenomena of transformation when media and logics interact and discuss their consequences for design.

1.1 Opportunities

According to WHO, 80% of Africa's population uses TM. Rationales may resemble those driving the global renaissance in 'holistic' or 'alternative' medicine, such as pursuing 'natural' life-styles or evading 'conventional' medicine's technologization. But, additionally, Africans' use of TM relates to healthcare availability, especially for 200 million rural dwellers, and cultural logics through which health and healing acquire meanings [7]. A scarcity of media content matched to everyday life and knowledge practices contributes to technology's inaccessibility and irrelevance to rural Africans and perceptions that computers suit only the formally educated [31]. Further, TM is a massive economy, crossing national borders and encompassing professional healers, herb gathers and merchants, in formal and informal enterprises, in rural and urban places [11]. Thus, enabling communities to generate, share and control content on herbs in TM provides opportunities for technological inclusivity and functions in trade and conservation.

Globally, numerous electronic archives store information about medicinal plants to curate heritage, disseminate 'Indigenous Knowledge' and in conserving or harvesting ecological resources. These tend to map herbs to scientific narratives about health and causes of ill-health (aetiology) [20, 31] and privilege Western cultural logics (e.g. intellectual property). In so doing they fail the logics intrinsic to many alternative medicines, such as knowledge as commonwealth, reverence for life [13] or links between the body, emotions and metaphysical manifestations [24]. This limits producing novel design patterns or human–technology relationships beyond those typifying ubicomp.

Web 2.0 distributed platforms and inexpensive devices for recording and distributing media (e.g. cellphones) offer opportunities to extend the ways people customarily share TM knowledge. Video [5] and digital storytelling (linking photographs to audio) [4] can convey the oral, beyond merely electronically writing spoken words. Consider how clinical students use video systems to visually compare their own to an expert's first-person perspective [2]. However, serving a technologically marginalised knowledge system requires accounting for the ways cultural logics shape, and are shaped by, patterns of saying and doing [7] including narrative and representations. In

Western locales, we use particular sets of graphic, scientific and media literacies to interact with healthcare information, from finding vitamins on supermarket shelves to following teach-yourself DVDs on therapeutic practices. These systems may not aim to discount social or metaphysical aspects of ill-health; the intuitive or vernacular in therapy; or social protocols in information; but they are selective. Choosing *what* to signify and *how* to represent is performative in episteme and producing reality; consider how writing constructed objectivity in medicine and X-rays contribute to imagining disease [1]. Indeed, medical science avoided graphics of the body until 1900, long after seceding from its own TM origins, because of dilemmas in re-presenting data transform phenomena. Thus, uncovering transformations situated in a community's appropriation of media is critical to designing for local logics about health.

1.2 Situating narratives

Design must respond to 'deep-culture values' [25] but we reject classical separations of technology: practice and designer: user. Instead, we subscribe to a situated approach in which interaction is 'a form of meaning making in which the artefact and its context are mutually defining and subject to multiple interpretations' [15]. Further, we consider all meaning-making to be dialogical, such that our understanding, as designers, of users implicates knowing about ourselves, our actions and experiences [23, 34]. Thus, here we illustrate how TM herb lore diffracts logics in actions in, and interactions with, 'Western' medicine, media and storytelling.

1.2.1 Spiritual and social aetiology

Experiences of individualised and physicalized health conflict with African TM narratives. Biomedicine distinguishes between somatic and social and between 'objectively' known organic dysfunctions of 'disease' and 'subjective' experiences of 'illness' and ill-fortune. However, aetiology in TM is characterised by social, supernatural and non-material elements [19, 21]. So 'African Diseases' are caused by relationship malfunctions, taboo violations and magical or divine entities purposefully invoked via instruments, such as bewitching or sorcery [19, 21]. For instance, Herero consider that people send some inflammations to others via ghosts. Thus, herbs act somatically, socially and mystically.

People actively participate in healing and pursue right social and spiritual relationships; for instance, by avoiding jealousy, maintaining dignity or appealing to ancestors to address social tensions [19, 32]. Thus, narratives about aetiology and identity interact. In African logic personhood is bound, inextricably, to others and identity produced

through relations with kin, clan and ancestors [28, 32]. This contrasts with medical science's neuro-culture, where self and experience resides, autonomously, in the brain and images of organs and genes can represent 'somebody'. Situating design involves responding to constructs about self as well as the role of family in managing ill-health [9]. Kin-relations are significant for Herero who practice a double-descent system (people remain of their male or female line); encourage cross-cousin marriage (from a parent's opposite-sexed sibling); permit polygamy; and may share childcare across generations.

1.2.2 Everyday bodily settings

Interactions with herbs may connect intangible principles to corporeal experience in tending, gathering and blending. Such embodied knowing [3, 7] about herbs conflicts with dualisms in Western medicine that, say, detach theoretical from practical know-how or the body from surroundings. Conveying the 'feel' of the movements of medical practice is important in Western clinical schooling when instructors physically interact with students to represent features using gesture synchronised with verbal cues [2]. However, specialisation (e.g. pharmaceutical, surgical) and their sites of practice separate biochemistry, physiology, felt-experience and everyday life. In contrast, African rural residents encounter the material substrate for survival (the land) and healing (herbs) banally; thus, movements in the environment and bodily experiences of health and healing may produce understandings in TM [13] and literacy [7] in herb lore.

1.2.3 Orality

TM practitioners share information on aetiology, ill-health manifestations and therapy orally. Scholarship of African orality includes linguistic and 'extra-linguistic' acts, such as gesture, movement, crafts and performance, and narratives have aural, visual and kinaesthetic qualities [12, 18]. African traditions have their own narrative forms and functions for vocal imagery [8], which intertwine with TM, social systems and power relations. Rather than eventuating in print, information is continuously recreated, accreted and distributed across groups. Thus, herb lore is shaped by social roles (e.g. some herbs maybe used widely but others only by initiated healers in sacred rites, prophecy or to evoke transcendent realities); community structures (e.g. hierarchical authority); processes (e.g. consensus-based decision-making); and nuances of participation (e.g. speaking and listening behaviours).

Print-facilitated culture propagates certain values such as the, refuted [12, 16], view that the cognitive interiorisation of writing fosters objectivity, detached analysis,

abstraction or categorisation [26]. Such accounts tune emphases in designing for oral users [27] or 'experiential' communication [25]. However, they neglect how cognition and verbal practice are specifically affected by particular literacies, reading and writing activities, schooling [16] and linguistic contexts [12]. Most of Namibia's two million population is fluent in at least two of the country's 9 regional, 3 colonist and 16 African immigrant languages. Multi-lingualism sustains plural ontologies and exposes everyday links between ways of saying, doing and knowing. For instance, African lexicons use colonial terminology for scientific concepts and few new Otjiherero words are officially documented for Namibia's 200,000 Hereros. Plurality is amplified by language representation in media; for instance, Otjiherero radio is varied but there is only one Otjiherero TV program: the weekly news.

2 Dialogic in interactions with media

Exploring transformations when herb lore and media interact contributes to our endeavour to design digital systems to extend the ways that Herero communities practice their rural knowledge traditions. We use ethnographic action research (EAR) [30] to combine techniques in which participants appropriate media [33] with ethnographic strategies to guide reflection and research. Rural participants had not depicted their knowledge by photography or video before, rarely use writing materials and some cannot read. They use few electrical technologies in their daily life, some listen to the radio or own a cellphone but coverage is limited and none access TV or grid electricity locally. We adaptively evolved and flexibly undertook media activities so that participants determined the use of media while we gained insights about interactions.

We used video first in response to participants' enthusiasm for it and because it records aural and visual aspects of speech, movements and settings. Video acted as sites to explore meaning-making and anchor our dialogic with users, settings and perspectives [23, 34]. Video content and participants' interactions during recording can 'thickly' depict discursive and embodied interactions. To enrich our dialogic, we recorded participants' interpretations in different activities involving video and other media. Video also acted in ideation; as one participant said: "when you take this [video] to the neighbouring place and show them they will also come up with their own ideas". Participants proposed various design ideas from specific media to disseminate herb lore (e.g. video, books) to unique functions for kin-based social networking. Here, we present insights about information transformations, from ethnography and analysing interactions and commentaries, (Fig. 1) to progress our schema in developing participants' ideas.
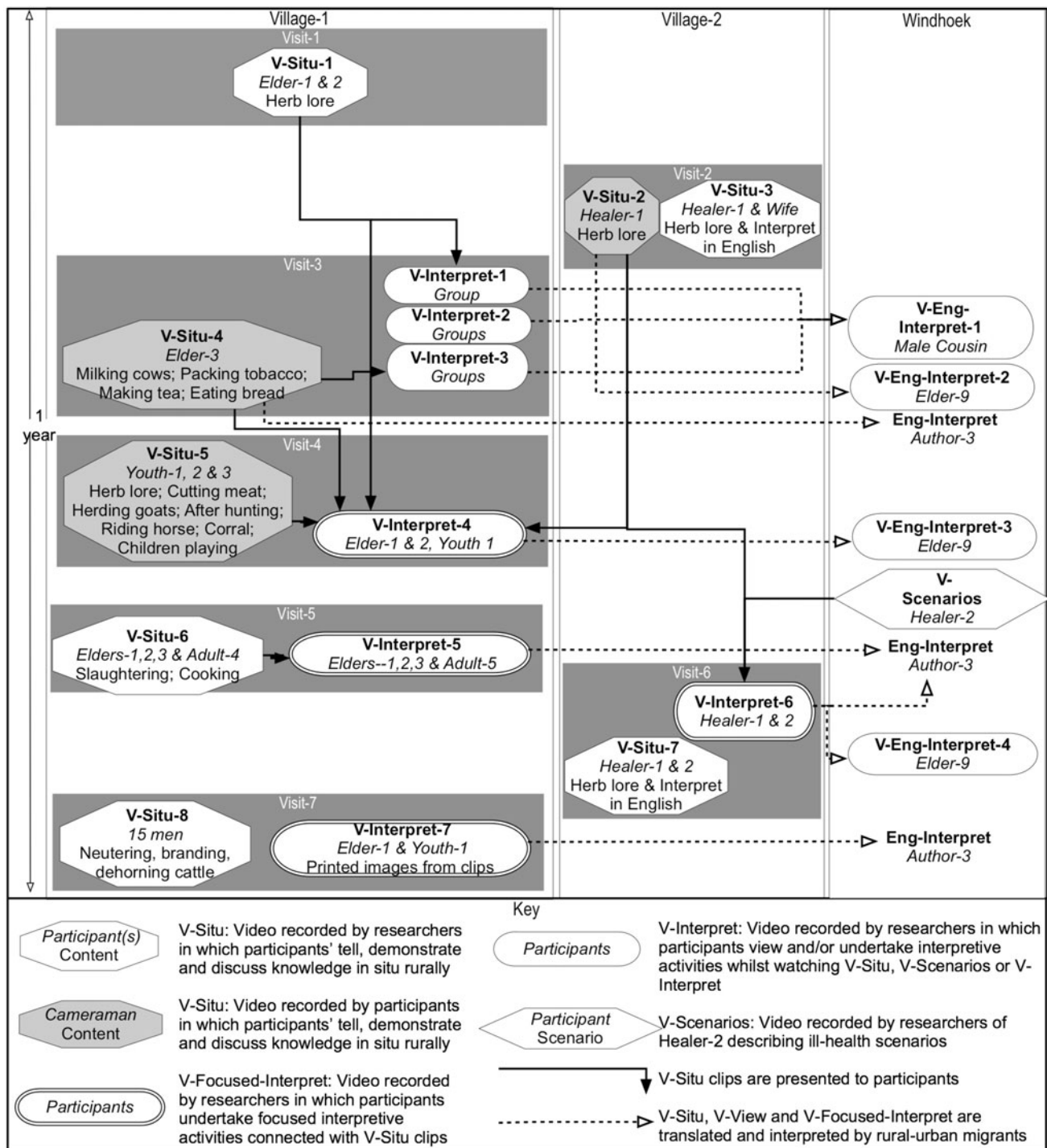
Fig. 1 Time frame of V-Situ, V-Scenarios, V-Interpret and V-Eng-Interpret video recordings

2.1 Sites and participants

Most participants are pastoralist dwellers in two villages, 50 km apart, in Omaheke region, near the Botswana border. The villages are accessed by gravel and sand tracks and can take 5 h to reach by car from Windhoek, Namibia's capital. To situate design in relations between

local knowledge systems and kinship [32] and cultivate the trust essential for researching African TM [11], we linked to the villages via participants in Windhoek. Many of the participants in Village-1 (Table 1) are kin of Author-3 who lived in the village until 12 years of age before moving to Windhoek with his family. Like many Herero rural-to-urban migrants Author-3 and his mother

Table 1 Gender and ages of primary local participants

Age	Male	Female
Over 60	Elder-1, Elder-2, Elder-6	Elder-5, Elder-7, Elder-8, Elder-9
45–60	Elder-3, Elder-9, Healer-1	
25–44	Adult-1, Adult-2, Healer-2	Adult-3, Adult-4, Adult-5, Healer-1's wife
15–24	Youth-1, Youth-2, Youth-3	

Table 2 Ethnic/cultural group, linguistic ability, familiarity with Namibia and gender of academic researchers participating in recording

	Ethnicity	Languages	Resident locally	Gender
Author-1	White	English, basic Otjiherero	Africa: 3 years	Female
Author-2	White	German, English, French, other Namibian languages	Namibia: 15 years	Female
Author-3	Black, Herero	Otjiherero, Afrikaans, English, other Namibian languages	Namibia: lifetime	Male
Author-4	Black	Zambian languages, English	Namibia: 10 years	Female
Researcher-1	Coloured	Afrikaans, English	Namibia: lifetime	Female
Researcher-2	White	Afrikaans, English, Dutch	Africa: Life-time	Male
Researcher-3	Black, Herero	Otjiherero, Afrikaans, English, other Namibian languages	Namibia: lifetime	Male
Researcher-4	White	German, English, basic Japanese	Visitor	Male

(Elder-9) return regularly to Village-1 to maintain their homestead and livestock. Village-1 participants routinely use herbal medicine but are not professional healers unlike Healer-1 and Healer-2 who can be classified as 'Diviner-Herbalists' [21] as they heal using herbs, prayers and guidance from spirits. Windhoek-based Healer-2 introduced us to Healer-1 and his wife in Village-2. Both are also pastors in the Namibian Apostolic Church, a syncretistic merging Christian and traditional Herero beliefs, but they treat patients independently of church. Healer-1 and his wife are slightly separate from their village by virtue of regard for, and the trusted nature of, healing work and were the only participants from Village-2, although we observed patients camping behind, and villagers visiting, their homestead. We recompensed all primary participants with modest, food hampers or payment for healing.

The eight academic researchers in our team have varied cultural identities, native languages (Table 2), religions and expertise. The authors of this paper comprise a man and three women, three Windhoek residents, and two Christians, a Herero-Christian and an atheist with Buddhist practices. We have research experience in cross-cultural Software Engineering, Action Research with Indigenous communities, psychology and neurophysiology.

2.2 Immersion and ethnography

Our dialogic is informed by everyday norms and spirituality gained culturally by Author-3 and when Author-1 lived with Elder-9 in Windhoek and in Village-1 for a month and undertook basic Otjiherero language lessons. The sensitivity of healing situations limits full ethnography, thus three of us undertook healing with Healer-1 in Village-2, and Healer-2 in Windhoek. We also gained insights during participants' serious health episodes and by attending Healer-2's Church.

2.3 Video collection

To uncover factors in interactions between media and herb lore, we gathered 30 h of video in Windhoek and during seven field-trips across a year. Throughout we reiterated to participants that we would not distribute video. The video is of four main types (Fig. 1):

- **V-Situ: Telling & demonstrating rural knowledge in situ:** In 6 h of video, participants' discuss and demonstrate their knowledge in Otjiherero in the yard or bush around their rural homesteads. When academic researchers recorded we were present as two or three men and women (Table 3).
- **V-Interpret: Viewing activities recorded in situ:** In 9 h of video participants viewed and/or undertook sense-making activities, some involving other media, related to previously recorded V-Situ video. All activities occurred at rural sites, involved two or three academic researchers and sometimes rural-to-urban migrants (Table 3).
- **V-Eng-Interpret: Interpreting recorded in Windhoek:** Author-1 recorded 12 h when two rural-to-urban migrants translated, into English, interpreted and added

Table 3 Participant and academic researchers involved in V-Situ and V-Interpret recordings (see Tables 1 and 2 for glossary of participants)

Video	No. of clips	POV	Speaker(s) & *other participants*	Facilitator and/or *translator* in activity	Camera	Observers
V-Situ-1	3	3rd	Elders-1 & 2	*Author-3*	Researcher-1	Author-4
	1	1st	Elders-1 & 2	*Author-3*	Author-3	
V-Situ-2	13	1st	Healer-1, *Healer-1's wife*	–	Healer-1	–
V-Situ-3	1	2nd	Healer-1, Healer-1's wife	*Healer-1's wife*	Author-1	Author-2
		3rd				
V-Situ-4	4	1st	Elders-3, 4, 5, 6, 7; Adult-4; Youth-1	–	Elder-3	–
		2nd				
V-Situ-5	33	1st 2nd	Elders-3, 5, 6; Adult-4; Youths-1, 3; Child-4, 5, 6	–	Youths-1, 2, 3	–
V-Situ-6	2	3rd	Elders-1, 2, 3, Adult-5	*Author-3*	Researcher-4	Authors-2, 4
V-Situ-7		3rd	Healer-1 & 2	*Author-3*	Author-1	Author-2
V-Situ-8		3rd	*15 men incl. Author-3*		Author-1	
V-Interpret-1	2	3rd	Elders-1, 3, 4, 5, 6; Adults-1, 2; Youth-1; *Child 1, 2*	*Author-3*	Author-1	Researcher-2
V-Interpret-2	2	3rd	Elder-7; Adults-3, 4, 5, *Child: 3,4, 5, 6, 7*	*Researcher-2*	Author-1	Researcher-2
V-Interpret-3	3	3rd	Elders-1, 5, 6; *Adult-4, Youth-1, Child 2, 3*	*Author-3*	Author-1	–
V-Interpret-4	4	3rd	Elders-1, 3; Youth-1	*Author-3*	Author-1	–
V-Interpret-5		3rd	Elders-1, 2, 3, *Adult-5*	*Author-3*	Researcher-4	Authors-2, 4
V-Interpret-6		3rd	Healer-1 & 2; *Healer-1's wife*	*Author-3*	Author-1	Author-2
V-Interpret-7		3rd	Elder-1, Youth-1	*Author-3*	Author-1	

stories to V-Situ and V-Interpret. Additionally, Author-3 translated V-Situ and V-Interpret.

- **V-Scenarios: Ill-health scenarios recorded in Windhoek:** Authors 2 and 3 recorded Healer-2 as he described five ill-health scenarios.

2.4 Analysis

We used Grounded Theory within ongoing EAR to derive themes from ethnography and video hermeneutically. Over the year themes shaped and were shaped by subsequent activities, analysis and discussion between researchers and participants. We started by analysing all video to limit prematurely delineating herb from other rural knowledge (Fig. 1). We analysed extra-lingual oral and multi-modal interactions, including gesture, body- and camera-movement, from visual qualities of video. This yielded 17 themes for V-Situ (Table 4) and 5 themes for V-Interpret on herb lore (Table 6). We derived 35 themes from translated content and communication practices in V-Interpret to render 17 language-based and 15 more general themes (Table 6). Altogether we derived 35 language-based themes by analysing translations of V-Situ and V-Interpret: some specific to herbs (e.g. Table 5) and others more general (e.g. Table 6). Author-1 coded independently and all authors discussed themes, as they emerged and evolved, to achieve consensus. We explicate some themes elsewhere [6, 33] but here discuss themes related to depicting local logic when media and herb lore interact.

3 Recording in situ

We first describe recordings in which participants tell, demonstrate and discuss knowledge. V-Situ presents different Points Of View (POV), or vocally and visually communicated perspectives, depending upon who controlled the camera and who spoke:

3.1 Academic researcher recordings

In 4 h of recordings, local participants had no control over the camera. For V-Situ-1, we filmed Elders 1 and 2 as they answered Author-3's questions, told stories (28 min) and illustrated herbs in situ (6 min). At the end of the year we also recorded, in 3rd POV, a group co-ordinating complex activities with cattle (V-Situ-8) and, in 2nd POV, two demonstrations of slaughtering and cooking on the fire (V-Situ-6).

3.2 Local participant recordings

Residents of Village-1 selected men to record 40 min of everyday activities and herb lore independently of us. We explained how to operate a battery-powered 'Flip' video camera and, first, Elder-3 used the camera for 2 h (V-Situ-5) and, then, a month later three younger men (age 18–25) each recorded clips over 2 days (V-Situ-5). The 37 clips vary in length: Elder-3's clips were 60–180 s and the youths' clips were 2–180 s. Short clips provided ad hoc

Table 4 Themes from visual qualities of video on herb lore recorded by participants (V-Situ-2 and 5) and researchers (V-Situ-1 and 3)

Point of View	1st POV		2nd POV	3rd POV	
V-Situ	-2	-5	-5	-3	-1
Number of Clips	13	5	3	1	4
Total Duration (mins)	17	5	3	90	34
Focus on plant not on participants E.g. plant fills frame; others come into view only partially	grey	dark			
Visually illustrating plant/parts E.g. smoothly moving camera showing different parts/views of plant	grey				
Visually indexical to plant E.g. within reaching distance of plant; hand holds material; hand or stick points at or pokes plants	dark	dark	dark	grey	light grey
Gathering actions E.g. digs into sand or under plant, or breaks-off or picks grass, berry, leaf	dark	grey	dark	dark	light grey
Describing preparation E.g. crushes leaves in hand, strips bark from twig, snaps twig, grinding and crushing gestures	dark		grey	dark	dark
Demonstrating plant use E.g. tying frond around wrist			dark		
Camera interacts with body E.g. shaking, swinging, jolting as cameraman walks, touches plant, gestures or changes hand	dark	dark	light grey		
Gestures to body E.g. Healer's shadow	light grey		light grey	dark	grey
Partial gestures E.g. many brief glimpses of Healer's gestures	dark	light grey			
Focus on subject(s)' interactions E.g. smooth shift of focus as people interact with and plants			light grey	dark	dark
Dialogue involves cameraman I.e. bodily actions of participants in frame respond to cameraman's speaking	light grey		dark		
Dialogue beyond cameraman I.e. bodily actions of participants in frame show speaking between those in view and/or elsewhere			light grey		dark
Social effects on visual/physical E.g. gender, elder-youth relations influence camera use, relative body positions	dark		dark	dark	dark
Novelty of camera effects didactic I.e. participants in frame avert their eyes from each other					dark
Visually indexical to setting E.g. panning wider visual context			grey	dark	grey
Gestures to wider setting E.g. Smoothly panning setting, gestures to setting			light grey	dark	grey
Rhythms in gestures E.g. hand movements have a tempo			light grey	dark	light grey

Shading shows frequency of instances supporting the theme coded for that set of clips relative to the occurrence of the theme in V-Situ clips of herb lore; dark—high relative occurrence and clear—no occurrences

Table 5 Selective themes from translations of Healer-1's speech about herb lore in situ

Herbs heal different people and animals

Family (4); *Woman* (2); *Man* (1); *Children/Kids* (4); *Orphans,* widows, widowers*; girlfriend, boyfriend; People who are criminally created and easily aggressive. Cattle* (2)*; Goats*

Social acts cause ill-health

Discourage; disrespect, *do not value*; Do not believe in you/what you say; Quarrels; Lack of *understanding* (3); *Disagree; Bad influence* of others

Supernatural entities cause ill-fortune

An entity *bites and enters the body*; Malevolent entity *passed by touch; Bad luck* causes a person *trouble* wherever he goes

The body has symptoms

Specific aches and pains (*back, head, breast, kidney, shoulder, menstruation, after giving birth*); Skin (*bedsores, burns, scabies; itching; insect bites; scratch; wound*); *Allergy from touching; Fever or cold; Heart problems*; High blood pressure; *Leg swelling; Breathlessness, like asthma; Vomiting too much* (e.g. when pregnant); *feeling nauseous* (2) *without knowing why* (1); *Allergy from eating; Ate or swallowed poison; Vaginal* infection*s; Not for the high blood and the sugar*

Herbs treat infertility

Female infertility; *People who cannot have babies; If the placenta is coming out after the birth; Man is too weak to make babies*

There are symptoms of behaviour, mind and emotion

Getting lost from home/kraal (2); *You don't know what you are doing with money*; Forgetfulness (2); *Bad manners; Failing, not doing well in school; child's brain got stuck somewhere*; Aggressiveness: *fighting and killing; Mad or mentally disturbed… crazy* (2); *Lonely; Embarrassed*; Discouragement (by others), Distraction (by others); *Worries*; Anger

Herbs effect people at home and beyond

For happy and lovely family; Be friendly and lovely; Become nice, cool no fighting; Chases bad feelings away; bring the whole kraal in a good form; Brings consensus; Keeps people faithful;

Ensures a specific *person will meet you*; Makes *people believe in what you are saying*; People will *welcome you when you visit*; To avoid *people who hate you.*

Herbs effect the body

Cleans and purges: *opens the veins; cleans the blood; runs through whole body*; induces *vomiting; It is going up someone will vomit and if its down its running stomach.* Reduces *fever; Dry bedsores; Heal wounds (immediately);* Absorb/*dries bad things in vagina; Smoke relieves the pressure; Gives appetite; Strengthens bones: body become strong and stable; Helps the body everywhere, wherever it is paining*

Herbs effect behaviour, mind and emotion

Become purposeful in school; Become sleepy until calm (2); *So you can rest* (2); *Will remember; Will bring a [lost] person back; Opens the mind; Take the bad memories out/away* (2); *Refresh the mind and heals memory; Release all the problems in your head. Change your attitude*

Herbs effect supernatural entities

Curses; Bad luck; Take the bad luck out of the body; It is sweeping any bad thing away

Herbs protect from animals

So that the snakes don't come; Keep mosquitoes away

Herbs are used in diagnosis

It will go straight to the pain in your body where the problems are and you can just identify it *yourself; You know what is wrong and which part you will give to the person*

Healer-1 knows the names of plants

Healer names 11 plants but his Wife and Elder-9 do not know all the names

Herbs are identified by physical characteristics

Dark brown; Berry has something hard inside, like bone; Hard things in the sand; Round things; Bit white; Green; Just thorns, it doesn't grow further; Like a potato; Is growing flat; When picked *many of the plants become yellow; Plants… can differ according to different soils*

Herbs have seasonal characteristics

Flowers or *fruits in rainy season* (4); Gathering herbs in the rainy season; December up to January, February, March

Use particular parts of herbs in healing

Roots (25); *Flowers/Leaves; Branch; Bark; Main part of the cactus;* Tubers: *Round things at end of roots*; Product *made by insects in sand inside ant hill; Different parts of plant for different uses*

Specific instructions for gathering and preparing herbs after gathering

Dig the roots when it is still wet; Take the whole plant out; Peel; Cut out the other part; Cut into two parts; Cut it in pieces; Cut it so it can get dry; Let the top part dry; Milk plant by scratching it; Grind it; Smash it (2); *Make it fine*

Table 5 continued

Specific instructions for preparing herbs for treatment

Boil in water (14); *Boil it for a time; Put it in water* (4); *Mix and cook with milk* (2); *Cook in bottom sauce for meat; Cook it; Cook with goat meat; Make it like a powder; Put in lotion* (4); *Put in Vaseline; Put on the coal* (2); *Make fire* (2); *Use the ash in front of the kraal, the holy fire; While it is still green with the meat; Becomes green*

Specific instructions for applying herbs in treatment

Drink (21); *With the soup*—water that you cooked it with; *Eat; Put it on the coals for smoke* (3); *Inhale, Smell* (3); *Bathe/Wash* (9); *Put inside vagina; Rub on* infected *place*; Enema: *Put at the back; Wash to smell scent; Plant as flower in yard; Place under the calabash; Throw* [herb-infused water] *to cover whole house and yard; Put it in house; Put into your pocket; Take the ash*

Timing and dosage directions

Take before rising or *speaking to anyone in the morning* (2); *Mix with food* or *drink before eating*; (2); *Don't wash among other* people; *Don't put salt in just put meat*; Over-dose: *Don't take too much otherwise you will get in trouble*; Observe *to see if it helps; Give a little and if they are not coming calm you give another small amount say 2 spoons; Before [Healer-1] gives it he tests it on himself*

Herbs have different and/or many purposes

Certain plants can heal; For many purposes (2); *Food* (3); *Small berries; Make the milk taste nice*

References to bodily felt-experiences

Berries tastes very nice (2); *It doesn't have a nice taste; It is bitter. It is not tasting nice*; *Pain* (4); *Feeling of vaginal infection—get warmth; Feeling weak*

We distilled these from V-Situ-3 when Healer-1's wife translated and we recorded; and, from V-Eng-Interpret 3 when Elder-9 translated Healer-1's own recordings (V-Situ-2). Italics show actual words used in translations. Brackets shows number of instances

insight. For 11 clips, the cameraman narrated, co-narrated or participated in the action (1st POV) and for 16 clips a cameraman interviewed the participants he recorded (2nd POV).

3.3 Local participant with academic researcher recordings

We recorded 1 h of video (V-Situ-3) while Healer-1, concurrently, recorded his knowledge (V-Situ-2). He moved around the bush near his home recording 13 clips, lasting 30–120 s, of different herbs using a 'Flip' camera. We recorded constantly for 1.5 h to include interactions when he was not recording and translations by his wife. V-Situ-2 is Healer-1's narrations from a 1st POV as he controlled the camera; while V-Situ-3 is 2nd or 3rd POV. Five months later we took Healer-2 to Village-2, gave him a camera, and recorded him as both healers walked in the bush 2 km from Healer-1's homestead (V-Situ-7).

3.3.1 Content

Clips that were sufficiently focused to analyse included: herb lore; activities with livestock in kraals; domestic and work activities in yards (Fig. 1). Participants explained aspects of herb lore for 25 plants, shrubs or trees growing in their yards, around the village or bush. Subjects or cameramen were within reaching distance of plants and shrubs but further from trees to render views of the whole. Participants orally described cause/s and symptom/s of ill-health, treatment and preparing herbs, but only one clip showed a herb being prepared: some roots on a metal sheet,

which Healer-1's wife said "[Healer-1] *takes it out from the field it was still wet and now he has to make it dry*".

3.3.2 Interactions between narrative, cameraperson and others

Participants' camera use embodied social relations between speakers and listeners. For most clips, there was a present listener, other than cameramen, either in or out of frame. In 70% of participant-recorded clips people were off-screen speaking or in-frame whether speaking or not. Social relations shaped cameramen's interactions with others and camera use. In V-Situ-5 and V-Situ-6 cameramen waited for subjects to speak, thus their interviews lasted longer than 1st POV narratives and their vocal interactions prevailed over their camera use, particularly if youth recorded elders. When Elder-3 recorded he shifted focus between the subjects he interviewed or as he approached subjects or panned the setting. In contrast, younger cameramen rarely moved in 2nd POV and their clips statically present subjects speaking or interacting with artefacts; indeed, Healer-2 failed to record because he was absorbed in talking to Healer-1.

Our ethnography shows that elders' authority scaffolds communication. However, unfamiliarity with technology may interrupt protocol. Initially, subjects being recorded were less comfortable than cameramen; thus, in V-Situ-1 elders talked to the camera, in response to Author-3's encouragement and questions, but were uneasy and did not make eye contact with each other or Author-3. Even when we were absent, those recorded averted their eyes from the camera, looking up, briefly, from activities but did not

Table 6 Themes from visual qualities and transcripts of recordings of participants discussing and viewing previously recorded video (V-Interpret)

V-Interpret	-1	-2	-3	-4	-6	-7
Total duration (minutes)	80	90	20	120	170	120
Loosely or Focused prompting of interactions with clips	L	L	L	L	F	F
Video provokes extending knowledge E.g. reflect on knowledge gaps, ask questions about video or plants. Local people are unaware of the different types of illness and treatments and seek more knowledge to be able to treat each other.	■	□	▨	■	■	▨
Various goals for generating and sharing content E.g. own health/survival; unify clan relations; training urban dwellers for rural life; *nature and people*; raise the awareness of outsiders to local problems	■	■	□	▨	■	▨
Participants have design ideas E.g. Audio recordings, phone-based social networking, ways to organise video, paper-based book	▨	░	■	░	■	■
Didactic involves attention to elders E.g. vocal interactions prevail over youth's camera-use when recording elders	■	▨	□	■	■	▨
Attend to oral over other information E.g. listen carefully, notice speech and gesture and did not notice some visual information. Reluctant to summarise or abbreviate	■	▨	■	■	■	□
Attend to people-centred information E.g. identify speakers orally and note the importance of recording villages and people names	■	▨	■	■	■	■
Situating knowledge spatio-temporally E.g. record herbs *in situ*, recognise a herb in a video more easily if they knew the site and made spatial references orally but stories order spatial references and events temporally	■	■	░	■	■	■
A people-focused lens on location E.g. refer to home/house, relate places to people and activities and do not concentrate on spatial precision	▨	░	■	■	■	■
Accountability in knowledge distribution E.g. offer herb-lore only with certainty, have concerns regarding contentious opinions, erroneous prescriptions and mal-practice accusations	■	░	□	□	■	░
Relate information integrity to speakers' pedigree E.g. concerns about who is 'qualified' to speak, trust information if they know a narrator's pedigree and insist on recording the names of villages and people *making the video*	■	░	░	□	■	□
Specificity in knowledge distribution E.g. not all people are familiar with plants, herbs have general or specific concern and a speaker responds to a recipient's interest	■	░	□	□	■	□
Acquire knowledge by experimenting with herbs E.g. confident in their experience in healing with herbs and may learn about some herbs by self-experimenting	░	□	□	■	■	□
Recognising herbs in video visually is not easy E.g. recognise plants with distinctive flowers but many herbs look similar and are difficult to discriminate in video	■	□	□	▨	□	░

Table 6 continued

V-Interpret	-1	-2	-3	-4	-6	-7
in video						
Recognising herbs in video orally E.g. narrators or viewers' oral descriptions aided recognising and disambiguating herbs	■	░				
Familiarity of herb names and nomenclature E.g. not all people know names of herbs or that some nomenclature indicates medicinal roles	░			■	■	
Physical and seasonal characteristics identify herbs E.g. orally describe herbs by colour, texture and flowering	░	░		■	■	░
Use particular parts of herbs in healing E.g. mostly use the roots of plants but also use leaves, flowers, berries, bark and sap	■			■	■	░
Specific instructions for gathering and preparing herbs E.g. drying, crushing, grinding, and milking	▦			■	■	
Instructions in treating with herbs E.g. drink in water, eat, suck, inhale fumes, carry in pocket; treatment dosage and timing	▦			▦	■	░
Plants heal different types of people and animals E.g. by age, by gender, by social situation, by species	▦			▦	■	░
Relate herbs to symptoms E.g. describe a body or social symptom when explaining a herb	▦			▦	■	░
Herbs treat the body E.g. herbs have a wide range of specific and general bodily effects	▦			▦	■	░
Herbs treat behaviour, mind and emotion E.g. herbs have a wide range of specific and general behavioural and psychological effects				▦	■	
Herbs treat social aetiology E.g. connect personal and society health and relate herbs to people. Social acts cause ill-health and herbs treat social relationships or affects at home and beyond				▦	■	░
Herbs treat infertility E.g. frequently mention fertility and connect this to society health	░			▦	■	
Participants occasionally mention spiritual aetiology E.g. herbs can protect against bad luck, treat curses or act on malevolent entities causing misfortune				▦	■	
Diagnosing with abilities and herbs E.g. Healer-1 describes spiritual guidance and use of herbs to diagnose illness					■	
Prescribing herbs E.g. Healer-1 accounts for situational specifics in herb-use and Village-1 participants emphasise the need for accuracy	■					
Plurality E.g. link herb use to Western medicine by analogy (*like anaesthetic*); complimentarily (will hasten affect of medication from the hospital); or alternative (if a person cannot access a hospital or clinic)	■		▦		■	
Touching or gesturing depict felt-experience E.g. reference to body parts combine with hand gestures	░	░		■	■	░
Tactile and kinaesthetic memory E.g. toy with plant material in recalling information and link corporeal and felt-experiences to learning about and using herbs				■	░	░
Divination involves touch E.g. holding a hand in diagnosing					■	

Shading shows frequency of instances supporting the theme coded for that set of clips relative to the occurrence of the theme in V-Interpret clips of herb lore; dark—high relative occurrence and clear—no occurrences

initiate discussion with each other or cameraman (V-Situ-3). Prevailing social interactions increased with familiarity with recording. For instance, over half of Healer-1's 1st POV clips include subtle interactions with his wife, during brief translations or questions, and our 3rd POV clips show that he held the camera in front of his face to look constantly at the screen for his first two clips but, progressively, lowered the camera to chest height, after setting up shots, to look at the plant, his wife, us or into the distance.

3.3.3 Interactions between camera, body and setting

Clips show that participants interacted, visually, with the wider surroundings less for herb lore, than other rural knowledge, and less when recording 2nd than 1st POV. Cameramen often panned or translated in 1st POV clips but not when recording herbs. A tighter focus meant participants' clips of herb lore were shorter than those of other rural knowledge. Strikingly, in participant-recorded 2nd POV clips the camera tended to move in response to interactions between subjects and herbs more than to interactions between subjects and artefacts involved in other rural knowledge.

In talking to us, and others, Healer-1 and most elders in Village-1 gesture frequently, and over half of our own and participants' recordings on herb lore show gestures (e.g. Figs. 2, 3). For five clips, Healer-1 swapped the hand holding the camera to permit him to gesture, sometimes twice in a clip. For his first six clips, he moved the camera in one hand to show parts of a plant, but increasingly switched hands, integrated his body while talking and, from his 10th clip, used the camera to gesture. Gestures to the wider surroundings are visible in over half of Healer-1's clips. Our observer-recorded video shows these gestures flow smoothly into gestures to herbs or his body; however, his own clips show only gestures to his body indirectly, in his shadow or when the camera jolts or shifts. Clips in 2nd or 3rd POV show that participants touch and gestured to plants. This is less visible in 1st POV clips, thus 75% of Healer-1's clips show gesturing and touching but do not show their extent. Healer-1 touched most plants with his foot or hand and, while recording four clips, snapped a twig or crunched leaves in his palm to show in front of the camera (e.g. Fig. 2c) but often his clips show only that a branch twitched. Indeed, in 40% of his clips his wife compensated by gesturing or touching and, like a 1st POV clip from Village-1, one clip shows Healer-1 used stick to point to a plant.

4 Interpreting video

For V-Interpret we recorded, in 3rd POV, participants viewing and commenting on V-Situ, in Otjiherero, rurally.

Fig. 2 Participant-recorded video (V-Situ-) of herb lore shows gestures and interactions with plants by subjects (**a**, **b**) and by cameramen (**c**)

For V-Eng-Interpret we recorded, in 2nd POV, participants translating into English and interpreting V-Situ and V-Interpret. Participants often added material; thus, altogether, V-Situ, V-Interpret, V-Eng-Interpret contains 65 herb stories.

4.1 Loosely prompted interactions with recordings

We recorded various activities as groups discussed media, recording processes and clips in Village-1 (Table 3). In V-Interpret-1, nine men and one woman (aged 16–75) discussed ethics, intellectual property, participation and

dissemination in relation to recordings for 1.5 h first without video and, then, while and after the group watched, on a laptop, V-Situ-1 (Fig. 3b). For V-Interpret-2, we interviewed four women (aged 20–60) as they cooked, collected wood and cared for children and discussed technology access, potential value of recording and current and past systems to disseminate knowledge via kin.

We also recorded groups viewing participant-recorded clips. In V-Interpret-3 four men and two women, who had not yet used the camera, discussed Elder-3's clips and in V-Interpret-4 three men discussed Elder-3's and the youths' clips.

4.2 Focused prompting of interactions with recorded material

To explore ways that participants, who had recorded and/or had been recorded, might associate clips with each other we recorded interactions in focused activities. We displayed thumbnails of clips in iTunes and asked Healer-1 and three men in Village-1 to group clips along various dimensions including:

- the ill-health the herb might address;
- appropriate audience for clips;
- the order in which people should view clips.

For V-Interpret-6, we recorded both healers when we asked Healer-1 to summarise what his clips were about and suggest which of his clips might treat ill-health scenarios described by Healer-2 (V-Scenarios). At the end of this session, we used sketches to aid communication.

For V-Interpret-7, we asked Elder-1 and Youth-1 to group and then sequence 50 printed images from all clips, according to their content and the order in which clips should be viewed (Fig. 4a). In another activity, Elder-1 took us to four places in the village and picked a herb at that location while Youth-1 photographed him and we registered a GPS co-ordinate. On returning to the homestead participants created a spatial map on butchers paper, by placing the picked herbs at representative locations, and then arranging images from clips according to where they thought those clips were filmed (Fig. 4b).

4.2.1 Knowledge distribution

In Herero didactics, knowledge holders are obliged to offer wisdom. For example, after a gentle scolding, by Elder-5, for not knowing a herb in a clip, Elder-3 amiably replied: "How will I know it if I wasn't told it?" Participants listened carefully and deferred to elders; for instance, Healer-2 would not add to Healer-1's accounts. Participants emphasised elders' responsibility for transfer across generations and that candour was essential in teaching.

Fig. 3 Researcher-recorded video (V-Interpret) of participants discussing (**a**) and viewing video (**b**)

Recording can interrupt this didactic since participants were initially shy and Elder-3 said he should have interviewed more actively.

In Village-1, participants distinguished between sharing stories and teaching by storytelling. They noted that a speaker responds to a recipient's interest and would not teach "someone who shows no interest in what you are telling" and Elder-6 said he knew little herb lore because he did not "bother" to learn when he was young. Some herbs have general concern, for instance "anyone can be a victim of a toothache so anyone should be told how to treat it", but others are more specific. Thus, a participant said, about a herb that cleans the womb after childbirth, "how would you explain to a man? Basically, it's the least of his worries".

Participants in Village-1 said even experts do not know all herbs and Healer-1 explained that the national Traditional Healers organisation recognises expertise areas. Viewing clips prompted participants' to reflect on gaps in

Fig. 4 Participants grouped and ordered (**a**) and also placed them on a spatial map they created (**b**)

their knowledge and extend their knowledge. This was often specific; for instance, Village-1 participants asked what a narrator was doing with some seeds in a clip; said that they would ask another person about an unfamiliar herb; and, Youth-1 gathered a herb in response to Elder-1's curiosity.

All primary participants knew recordings were to inform systems design, which thwarts ascertaining relationships between narratives and anticipated audiences. Village-1 participants said they had no particular audience in mind when recording and Healer-1 added warnings that information/herbs should be kept from children when we asked him to indicate viewers for specific clips.

Participants in Village-1 were reluctant to offer information without certainty and discussed their unfamiliarity with some plants and concerns regarding contentious opinions and erroneous prescriptions and who is 'qualified' to speak. Healer-1 is "*scared*" about mal-practice accusations, saying "… *there might be questions. How many people did you give this? How many people did you kill?*". Nonetheless, participants mentioned various goals for generating and sharing digital content. They seek to: teach

specific knowledge for their own health/survival; unify clan relations; prepare rural-to-urban migrants for returning to rural life; disseminate herb lore for "*nature and people*"; and, raise the awareness of government and others to local problems so they "*see that we are living this way and help by giving [us] food…*".

4.2.2 Orality and person-based information

In all viewings, participants consistently noticed speech and gesture above other visual information. For instance, Elder-1 said a clip lacked the details about whether to milk a cow from the left or right, yet this is visible. Sometimes participants had difficulty recognising thumbnails of clips or plants visually in clips even if these were distinctive to us. Some herbs in clips were highly familiar, visually, such a yellow flowered plant which all participants said benefited goats and tooth-ache. In such cases, they identified the herb by its Otjiherero name and/or a visual feature and discussed preparation and use. Participants recognised a herb visually more easily if they knew the site where it was filmed but recognising sites was often difficult as clips focused on herbs. Oral cues aided recognition, disambiguated herbs and identified speakers. Elder-7 insisted that she would recognise speakers by audio alone even years later and all participants emphasised the importance of recording the names of villages and those 'making the video'.

We cannot untangle participants' priorities in oral aspects of video from social relations among the group viewing, such as elders and youths; however, trusting information related to recognising a narrator's pedigree. Negotiating information integrity and speakers' pedigrees occurs within an extensive, intricate and transgenerational network of kin. Elder-3 said Elder-1's wisdom resulted from growing-up with ancestors who used herbal practices regularly and Healer-1 said he learnt herbalism from his father and inherited his mother's healing intuitions. Participants trusted information in Healer-1's clips though these did not identify him visually; perhaps because we mimicked how patients select healers through personal recommendation and/or because Herero oral custom accentuates imagery of people's characters, person-hood, societal position and genealogy [8]. Thus, as explicated elsewhere, designing needs to connect knowledge to depictions of social-relational spaces [6].

Acute attention to person-based more than other visual information may reflect earlier customs of storytelling in a circle around the evening fire and is supported by participants' gestures to explain herb preparation and use. For instance, after viewing a clip Elder-1 ground his fingers onto his palm as he said "*make it fine; you just sniff it and you will get rid of your headache*" and, later, Youth-1

described herb-use by gesticulating as if putting snuff to his nose. This sensitises us how information is significantly limited by video's affordances for a narrator's gestures and the uni-directionality of visual display.

4.2.3 Social topokinesis and kinaesthetics

Participants' and researchers' focus contrast. Participants' use of spatial references led us to observe that they locationally situated herb lore; for example, Elder-1 said he would discuss a particular herb "*only when we are outside*" and referred to a plant growing behind the homestead, before telling how to clean, cut and put its root in a calabash to sour milk. However, while sites associate with participants' practice, practices seem less bound to sites. Consider how the 'Holy Fire' burnt continuously to maintain favour with patrilineal ancestors (who cause misfortune if displeased) has more variable locational than temporal characteristics [6]. Also, consider how signs of people's and livestock's daily rhythms in the landscape enabled customary navigation and that some participants know that village names relate landscape features to their history [6]. Herero's environmental literacy does not appear to construct places with impersonal, fixed geographies perhaps because, until 50 years ago, they continuously relocated as nomadic cattle-herders and then under colonial and Apartheid policies. Indeed, participants spent time gesticulating around the homestead and talking about people and activities rather than concentrating on achieving spatial precision when arranging images from clips on the aerial map they created (Fig. 4).

Temporal ordering of spatial references in narratives suggest knowing through movement, or topokinesis [13]; for instance, Elder-1 learnt about a novel herb when he "*went to a second place in the village and was looking after the goats*". Topokinetic memory might embed knowing within felt-experiences in gathering preparing and using herbs; for instance, Elder-1 said he "*got lost and was hungry and thought of a certain wild food*". Both Healer-1 and Elder-1 learnt about some herbs by experimentation and Healer-1 commented that he tested all herbs on himself before prescribing them (contrary to formal Western medical training which tightly controls novices' experimentation on themselves). This suggests designing to link intangible felt-experience, bodily interactions, herbs and locations. However, these links must account for a social lens on movements and locations.

> When I gave birth to [her son's] brother my breast was swollen and so hard I couldn't even suckle, the milk couldn't come out. So [her husband] heard the story from somebody, he went to the field there in [another tribe's] location, so we put fat on it, butter,

burn it on the fire and I put it under the breast, here, so the smoke just go over the whole and then that grease, those black things. It became soft and so on.

Between watching clips Elder-9 went to various cupboards around her Windhoek home and returned with herbs, often sent by Elder-1, which she described by gesturing and interrelating her body to her rural home. Thus, it seems associations between herbs, the body and social relations might reside within tactile and kinaesthetic interactions. When Elder-3 illustrated a herb to protect against bad luck, and related social aetiology, he toyed with plant material in his hand and tied a frond around his wrist. Tactile interactions and gestures feature in exploring, experimenting and constructing understandings as well as communicating [14]. Certainly, participants described herbs with tactile qualities, such as texture (Table 5), and touching herbs assisted recall; for instance, Elder-1 twirled a plant in his fingers while trying to remember its name. Tactile learning of social associations is suggested by a game, participants recounted, in which girls and boys chase and beat each other with "*mother*" and "*father*" plants. Divination also involves touch and Healer-1 held Author-2's hand while explaining:

> When the person comes to me, the person doesn't tell me the problem, but I will check the person. I will catch their hand and I check what is in the person's body.

Indeed, the charismatic affects of prolonged rhythmic clapping, harmonised song and laying hands on bodies were palpable during Sunday service in a humble shack that is Healer-2's church. Thus, connections between herbs, felt-experiences, movements and social relations seem critical to designing but, as we discuss next, affordances and associations with media hinder accessing these phenomena.

4.2.4 Media occludes cultural logic

Along with linguistic translation qualities of, and participants' associations with, media alter narrative and occlude local logic. Narratives foster causality through succession but participants ordered information about herbs differently when watching clips. If they described a herb in situ or added stories about herbs unmentioned in clips participants tended to say symptoms or causes of ill-health first. But when they discussed herbs concurrently with, or just after, seeing a clip they identified it then described preparation and parts to use and, finally, symptoms and causes. Watching video prompts sequences starting with herbs rather than health, suggesting that video facilitates re-

seeing so participants associate recognising herbs in clips with subsequent actions rather than, say, reasons for gathering.

Narrative transformations are initiated by involuntary and voluntary selectivity in recording. In V-Situ participants illustrated plants growing in situ and described, but did not demonstrate, preparation and treatment. During viewings participants reflected that they should record more details of preparation and dosages: "*The thorns, how do they use it? They take it and they put it on the tooth. But you must explain how to use it.*" Recording plants in situ may reflect reverence for flora, since participants always walked carefully around all plants, or that preparation is not daily routine unlike, say, milking. However, even Healer-1 focused on herbs in situ and did not record bathing areas or fires but verbally described washing and using the fire.

Existing media may influence participants' selectivity. For instance, books on medicinal and edible plants in Namibia emphasise visual identification; and, TV illustrates how Namibia's unique habitat shapes national identity, concerns and economy. Focusing on plants may indicate participants' perception of what is comprehensible to designers beyond their community, such that plants function as 'boundary objects' [29]. Alternatively, their focus may indicate a perspective on communication when presence is not guaranteed; for instance, to distinguish between face-to-face 'telling' and using recording media to 'show' 'analytically' [25].

Along with the constraints of video on depicting a narrator's gestures, herb preparation or felt-experiences, participants may consciously censure logics about causality in recordings. In V-Eng-Interpret-5 Elder-9 asked, "*must I tell you that?*" before translating Healer-1's explanation about a herb to purge malevolent spirits:

> someone killed people and those things… how can I say? Those things [that] are following him. Now he will maybe come and just touch you and these things will go to you.

Participants explicitly connect personal and society health in transcripts of scripts (e.g. Table 5) but, unlike ethnography, rarely mentioned spiritual aetiology. The symptoms of over 30% of herb stories concerned social relationships or affects. However, participants did not mention bewitching, mentioned possession tangentially and curses and bad luck in only 6%. In V-Interpret-5 Healer-1 said: "*I will know the colour of the underwear you are wearing … where you have a birth mark. It is the spirit that is telling me.*" Occasionally, he used biblical metaphors to explain herbs to us; for instance, "*in the boat of Noah, they were male and female, so these plants are like that*". When we asked participants why Healer-1

did not mention spirits, ancestors or dreams when he recorded clips, as he did in our healing experiences, they suggested such aspects are "*an introduction, when you start healing someone*". The omission may indicate power relations [11, 32]. Historically, Christianity and Apartheid separated herbalism from spirituality [21] and, while formerly Hereros depicted sacred relations (e.g. on milking calabashes), Lutheran colonists were suspicious about tangibly representing divine forms. Contemporary politics, elsewhere in Africa, contribute to Indigenous religious practitioners' opposition to filming rituals [10]. However, Healer-2 was not opposed to videoing his church service, although we refrained. Thus, at this stage, we conjecture that recording is simply incommensurate with participants' spiritual reality. For instance, when Elder-9 translated Healer-1's description of one purpose for a herb she mentioned a curse (V-Eng-Interpret-5) that Healer-1's wife did not mention when translating in situ (V-Situ-3):

> You take a warm coal from the fire and you let the person bleed on this. It's the moving diplomat. … and then you let the person smell. The one who cursed you this one will take. It will go back to the person and that person will start bleeding. Things are happening in reality…

Chains of transformations, which start with participants' selectivity in recording, confound depicting local logic. When we asked how to cluster clips, Elder-1 said: "*The plants must be together, and the people together*". However, distinguishing herbs from activities is incompatible with both participants routine use of roots to sour milk, since only some roots are medicinal, and the medicinal use of non-plant-based products, such as insect secretions used by Healer-1. Thus, this taxonomy is prompted by recording not local practice and, as we show next, obscures local logic.

4.2.5 Cultural logics in temporal aesthetics

Elder-1's categorisation of clips as "*people*" or "*plants*" was prompted by recording not everyday practices interrelating herbs or associating herbs and activities. Comments in V-Interpret suggested there might be causal links between symptoms and herbs. Participants mentioned responding to symptoms (e.g. "*When you got a headache what are you supposed to do?*"), occasionally compared herbs to pharmaceuticals (e.g. '*like those tablets, allergics*', '*an anaesthetic*') and nomenclature sometimes indicates medicinal roles; for instance, Elder-1 noted a herb "*has another name but when you come to use it to heal people, it's called X*". Further, although economics, transport and geography deny most participants access to clinics or

hospitals, if able they use practitioners from Western and traditional medicine simultaneously. For instance, within 1 h a participant in Windhoek used an electronic blood pressure monitor, took hospital-prescribed pharmaceuticals, drank herbal tea and arranged a visit from Healer-2. Indeed, some healers' repertoires even include biomedical techniques and concepts [19]. Thus, we were provoked to explore 'symptom-based' reasoning. However, when we asked Healer-1 to suggest which of his own herb clips might treat Healer-2's ill-health scenarios (V-Scenarios) he said that V-Scenarios required herbs he had not recorded or, more complexly, that any prescription must account for situational specifics. Indeed, Healer-2 uses different herbs in Windhoek.

Directly relating herbs to symptoms mismatches local logic. It results from sparse depictions of causality in V-Situ clips and oversights produced by our ontological framing. For instance, participants frequently used concrete and metaphorical examples but analysis (e.g. Table 6) neglects the linguistic subtleties of metaphor use in Otjiherero [2]. Herero Researcher-3 suggests that our abstractions interrupt participants' stories. Indeed, when we asked Healer-1 to summarise what clips were about, to guide Healer-2 in choosing to watch a clip, he reiterated and/or extended information in the clip, and said his summaries were "*too short*".

Rather than further categorizing or abstracting into body, spirit and sociality (e.g. Table 5) we considered whether assembling groups of narratives may depict cultural logic. Participants' narratives ordered events and spatial references in causal chains so we explored temporal interactions with herb lore. We used printed and electronic thumbnails from clips, to reduce possible effects that watching video has on narrative, and participants sequenced thumbnails in the order that clips should be watched (e.g. Fig. 4). Their interactions suggest logics about temporality that a point-based chronology, such as a timeline, cannot preserve.

First, participants attended to relationships between people in clips when ordering thumbnails. This echoes our observations that participants prioritise interpersonal relationships and construct time relative to others; such as arranging activities with us without absolutes (e.g. "*in the morning*", '*later on*') and being unfamiliar with calculating ages and years. Such polychronic construction [25] has consequences for media; for example, cameramen and viewers do not experience the shared, present time of face-to-face talking that might itself embody logics about community.

Secondly, temporal patterns contain information. Consider temporal aesthetics in the details that Healer-1 explicated for a specific herb family in a sequence of "*families*".

… It's the first herb that you must start with, because the first part of the person is by birth. The way you are raising up the child, so that the child can't get mad and run away, go on the street, be involved in crime. So that people can get children who will later come vote and the nation will grow. If the child starts to get depression that lady won't get children anymore so the government will not go forward. We start with the first thing to help people get children. Number 1. So you can also get a normal child with a normal brain …

Conspicuous repeating, cycling patterns within this brief story encode:

- Causal relations between a child's birth, health and community
- Relationships between the herb and birth
- Unfolding events in a child's life

Healer-1 interconnected stories of subsequent herb families to address post-natal conditions (depression, haemorrhoids), breast-feeding and allergy, which together depict events during a woman's fertile years. This illustrates a third point: narratives represent time in various non-coincident ways. Along with sharing time in face-to-face speaking and depicting the timing of events there is also a time 'lived' in the story, which carries information. For instance, portraying ancestral time (e.g. "*my father told me*") might contribute to information integrity linked to a narrator's pedigree.

Depictions of time, verbal patterns arching across phrases, segments or motifs engage listeners and invoke emotion, assist remembering and reflect social relationships [12]. Slicing and hyperlinking oral items (e.g. in the spoken-web [17]) transform these. Further, gestures to herbs, settings and the body sometimes resonate with verbal rhythms to embody tacit logics and extra-linguistic, felt-experiences and ideas. However, affordances of media constrain depicting gestural rhythms; for instance, Healer-1's clips do not show the loose tempo of his hands quivering, sweeping over and cupping his abdomen, limbs or head.

5 Conclusion

Exploring situated interactions between audiovisual media and narratives of herb lore has nourished our dialogic with users of TM in an African community for the purposes of design. Video shows links between self and community that are integral to pedagogy and the importance of enabling rural Herero to represent herb lore within the social-relational space that contextualises knowing, doing

and moving. Consequently, we cannot generalise themes beyond the social-relational space that contextualises herb lore.

Participants prioritised speech, gesture and bodily interaction above other visual context and we suggest this involves connecting corporeal and felt-experiences, wellness, healing, spirituality and community. But associations with, and affordances of, video start a chain of narrative transformations. These confound aligning our analytic lenses with local logic, in addition to transformations of re-representation in linguistic translation. For instance, categorising video into '*plants*' and '*people*' or exclusive links between herbs and symptoms mismatches local practice. Participants' assemblies of groups of video along temporal dimensions revealed important qualities both within and between narratives. Oral depiction of time and temporal patterns arching across stories engage listeners invoke emotion and reflect social relationships. Abstraction occludes and point-based information management removes these temporal qualities. Thus, designing must respond to situated oral patterns, such as repetition and timing [4].

We have emphasised transformations, when introducing media, to orient in a community before evolving technical implications. We hope to provoke appreciating the conceptual consequences in designing for the cultural logics of millions who do not privilege a science of the body over the social and spiritual. We show that recording and analysis reveals, obscures and conflates the articulated and tacit of all the knowledge systems involved. This illustrates how requirements analysis for "globicomp" must negotiate the many narrative and representational mediations involved in producing people's realities around the world.

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